Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A method of improving data playback error performance in data storage devices for storing data on removable data recording media, each data storage device having multiple read/write heads for recording data to the media during a write process and for playing back data from the media during a read process, comprising the steps of:

(a) selecting a target error rate for recording data during the write process, for one or more of the data storage devices; and

(b) for each data storage device, determining a dither value for each head in the data storage device, wherein for each head, using the corresponding dither value for the write process essentially provides said selected target error for all the heads.

2. (Original) The method of claim 1, wherein in step (b) the write process for each head comprises the steps of:

writing data blocks to the media; and

reading said data blocks from the media while introducing dither into the read-back signal as a function of the dither value.

3. (Original) The method of claim 2, wherein in step (b) the write process for each head further includes the steps of:

determining the error rate of the read data;

comparing the read error rate to the target error rate, and repeating the write process if the read error rate is greater than the target error rate.

4. (Original) The method of claim 2, wherein in step (b), determining a dither value for each head further includes the steps of, for each head:

(1) writing data blocks on a recording media, and reading said data blocks from the media while introducing dither into the read signal as a function of different dither values;

(2) measuring the error rate generated for each dither value; and

(3) based on the measured error rates, determining a dither value which generates an error rate at essentially the target error rate for that head.

5. (Original) The method of claim 4 wherein in step (b)(3), determining said dither value for a head further includes the steps of:

selecting a first dither value that generated an error rate below the target error rate;

selecting a second dither value that generated an error rate above the target error rate; and

performing interpolation between the first and second dither values, to determine a dither value that generates an error rate at essentially the target error rate for that head.

6. (Original) The method of claim 2, wherein step (b) further includes the steps of, before determining said dither value for each head, prequalifying each head and recording media for recording/playback operations, including the steps of, for each head:

(1) writing data blocks to a first section of the media using a first dither value in a first write process, and measuring the generated error rate for that head,

(2) writing data blocks to the first section media using a second dither value in a second write process, and measuring the generated error rate for that head,

(3) if the measured error rate for each dither value is above the target error rate, then repeating steps (1) and (2) for a second section of the media using said first and second dither values, wherein if the measured error rate for the each of the first and second dither values on the second section of the media is above the target error rate, then that head is indicated as a faulty head.

7. (Original) The method of claim 6, wherein in step (b)(3), if the measured error rate for one of the first and second dither values on the second section of the media is at or below the target error rate, but the error rate for another head is above the target error rate for both the first and second dither values, then that media is indicated as faulty recording media.

8. (Original) The method of claim 2, further including the step of:

(c) in a write process for each head, writing data blocks with that head while reading the data blocks and introducing dither into the read signal in the head as a function of the determined dither value for the head.

9. (Original) The method of claim 8, further comprising the steps of:

(d) during a read process for each head, reading data with that head without dithering.

10. (Original) The method of claim 8, wherein step (c) further includes the steps of, upon detecting a block error while writing a data block on a section of the media, re-writing that data block.

11. (Original) The method of claim 9, wherein re-writing that data block further includes the steps of re-writing that data block on a different section of the media.

12. (Original) The method of claim 9, wherein re-writing that data block further includes the steps of re-writing that data block using a different head.

13. (Original) The method of claim 9, wherein re-writing that data block further includes the steps of re-writing that data block on a different section of the media with a different head.

14. (Original) The method of claim 1, wherein the storage device comprises a tape drive including multiple transducer heads, and the recording media comprises magnetic tapes.

15. (Original) A method of improving data playback error performance in data storage devices for storing data on removable data recording media, each data storage device having multiple read/write heads for recording data to the media during a write process and for playing back data from the media during a read process, comprising the steps of:

(a) selecting a target error rate for recording data during the write process, for one or more of the data storage devices; and

(b) for each data storage device, determining the amount by which to artificially degrade the read signal during the write process for each head in the data storage device to essentially provide said selected target error rate for all the heads.

16. (Original) The method of claim 15, wherein step (b) further includes the steps of, determining a dither value for each head in the data storage device, wherein for each head using the corresponding dither value for the write process essentially provides said selected target error rate for all the heads.

17. (Original) The method of claim 16, wherein in step (b) the write process for each head comprises the steps of:

writing data blocks to the media; and

reading said data blocks from the media while introducing dither into the read-back signal as a function of the dither value.

18. (Original) The method of claim 17, wherein in step (b) the write process for each head further includes the steps of:

determining the error rate of the read data;

comparing the read error rate to the target error rate, and repeating the write process if the read error rate is greater than the target error rate.

19. (Original) The method of claim 17, wherein in step (b), determining a dither value for each head further includes the steps of, for each head:

(1) writing data blocks on a recording media and reading said data blocks from the media while introducing dither into the read signal as a function of different dither values, during the write process;

(2) measuring the error rate generated for each dither value; and

(3) based on the measured error rates, determining a dither value which generates an error rate at essentially the target error rate for that head.

20. (Original) The method of claim 19, wherein in step (b)(3), determining said write dither value for a head further includes the steps of:

selecting a first dither value that generated an error rate below the target error rate;

selecting a second dither value that generated an error rate above the target error rate; and

performing interpolation between the first and second dither values, to determine a dither value that generates an error rate at essentially the target error rate for that head.

21. (Original) The method of claim 17, wherein step (b) further includes the steps of, before determining said dither value for each head, prequalifying each head and recording media for recording/playback operations, including the steps of, for each head:

(1) writing data blocks to a first section of the media using a first dither value in a first write process, and measuring the generated recording/playback error for that head,

(2) writing data blocks to the first section media using a second dither value in a second write process, and measuring the generated recording/playback error for that head,

(3) if the measured error rate for each dither value is above the target error rate, then repeating step (1) and (2) for a second section of the media using said first and second dither values, wherein if the measured error rate for the each of the first and second dither values on the second section of the media is above the target error rate, then that head is indicated as a faulty head.

22. (Original) The method of claim 21, wherein in step (b)(3), if the measured error rate for one of the first and second dither values on the second section of the media is at or below the target error rate, but the error rate for another head is above the target error rate for both the first and second dither values, then that media is indicated as faulty recording media.

23. (Original) A data storage device for storing data on removable data recording media, comprising:

multiple read/write heads for recording data to the media during a write process and playing back data from the media during a read process; and

a controller for controlling recording/playback operations with the heads, wherein the controller is configured to artificially degrade the read-back signal for each head during a write process to essentially provide a selected recording target error rate for all the heads.

24. (Original) The data storage device of claim 23, wherein to degrade the read signal the controller is further configured to introduce dither into the read-back signal during a write process for each head as a function of a dither value selected for that head, such that all heads provide essentially said selected target error rate.

25. (Original) The data storage device of claim 24, wherein the controller is further configured for the write process for each head to write data blocks to the media, and read-back said data blocks from the media while introducing dither into the read-back signal as a function of the selected dither value for the head.

26. (Original) The data storage device of claim 25, wherein the controller is further configured to the write process for each head to determine the error rate of the read-back data, and to compare the read error rate to the target error rate, and repeat the write process if the read error rate is greater than the target error rate.

27. (Original) The data storage device of claim 25, wherein a dither value for each head is determined by writing data blocks on a recording media and reading back said data blocks while introducing dither into the read-back signal as a function of different dither values during the write process, measuring the error rate generated for each dither value, and based on the measured error rates, determining a write dither value which generates an error rate at essentially the target error rate for that head.

28. (Original) The data storage device of claim 25, wherein the controller is configured to read data from the recording media during a read process without dithering the head read signal.

29. (Original) The data storage device of claim 28, wherein the controller includes a dither circuit coupled to a read/write signal path in the storage device via a switch, wherein the dither circuit provides a dither signal based on the dither value for each head, such that for a write process the controller closes the switch to inject the dither signal into the read-back signal for each head, and for a read only process the controller opens the switch.

30. (Original) The data storage device of claim 23, wherein the controller is configured to detect a block error in writing a data block on a section of the media, and in response, re-write that data block.

31. (Original) The data storage device of claim 30, wherein the controller re-writes that data block on a different section of the media.

32. (Original) The data storage device of claim 30, wherein the controller re-writes that data block using a different head.

33. (Original) The data storage device of claim 30, wherein the controller re-writes that data block on a different section of the media with a different head.

34. (Original) The data storage device of claim 23, wherein the data storage device comprises a tape library including a plurality of tape drives including multiple transducer heads, and the recording media comprises magnetic tapes.

Claim 35. (canceled)

Claim 36. (canceled)